ZUUM MEDIA™

Model: HE1

Pro SERIES

HDMI over Single CAT5/6 Extender

User Manual

(HE1-TX Front/Back)

(HE1-RX Front/Back)

Made in Taiwan
ZM 100510

SAFETY AND NOTICE

The **HE1 HDMI over Single CAT5/6 Extender** has been tested for conformity to safety regulations and requirements, and has been certified for international use. However, like all electronic equipment, the HE1 should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

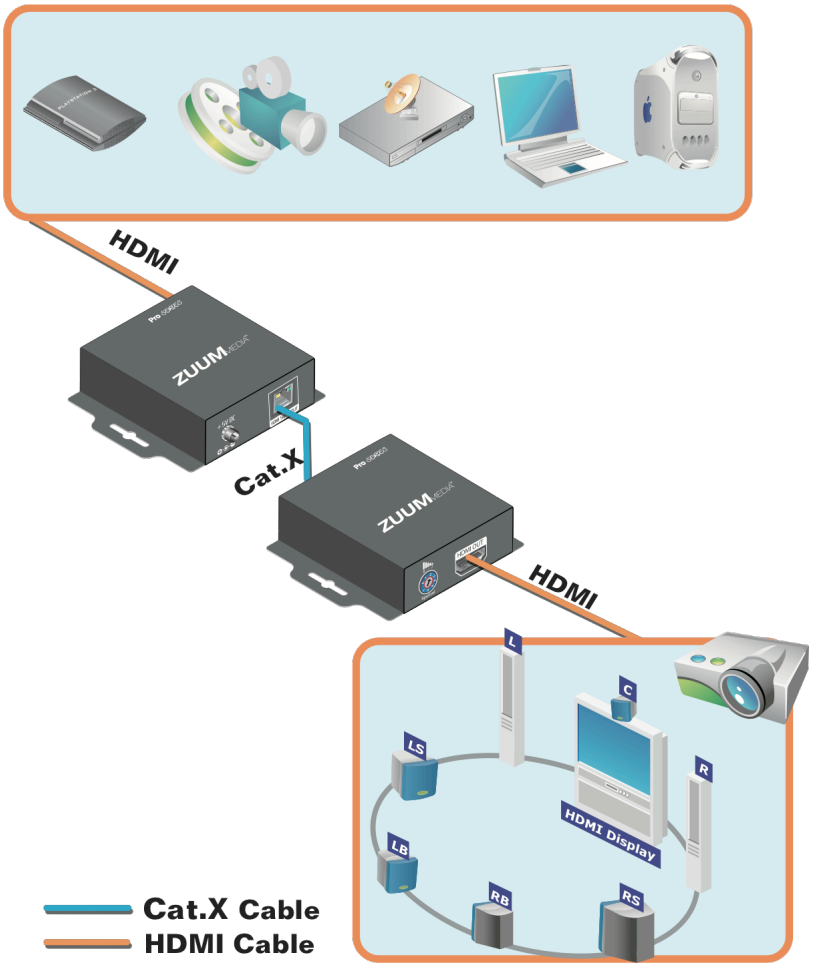
- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation and air circulation and do not use near water.
- Keep objects that might damage the device away and assure that the placement of this unit is on a stable surface.
- Use only the power adapter and power cords and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

INTRODUCTION

The **HE1 HDMI over Single CAT5/6 Extender** boosts up your video/audio transmission distance up to 60m (200ft) in HDTV 1080i format, 40m (130ft) in HDTV 1080p format, and 20m (65ft) in HDTV 1080p with 36 bit color depth. With only one cost effective Cat-5/5e/6 cable, users can readily extend HDTV sources from DVD players, Blu-ray Disc player, PS3, PC, and any other kinds of sources compliant with TMDS to distant display monitors including HDMI or DVI enabled TV sets or LCD PC monitors. With the state-of-the-art Silicon Image chipsets equipped, deep color video, DTS-HD or Dolby TrueHD audio, and HDCP supports and compatibility are all further insured. This flexibility makes HDCP compliant DVD players or PS3 transmit utmost high quality video and audio with a greater distance at the minimal cost, when integrating several components apart.

The HE1 includes two units: transmitting (HE1-TX) and receiving (HE1-RX) units. The transmitting unit is used to capture the input HDMI or DVI signals and carry the signals through one RJ45 connector into one cost effective Cat-5/5e/6 cable. The receiving unit is responsible for equalizing the sent TMDS multimedia data. The transmission distance between the sending and receiving units can be up to 60m (200ft) under HD (720p/1080i) or 40m (130ft) under Full HD (1080p). With an 8-level equalization rotary control on the receiving unit, users can adjust the equalization strength to the received TMDS signals accordingly, and therefore optimize the transmission distance between source and destination.

APPLICATION



SPECIFICATIONS & PACKAGE CONTENTS

Model Name		HE2		HE2IR		HE1	
Technical		HE2-TX	HE2-RX	HE2IR-TX	HE2IR-RX	HE1-TX	HE1-RX
Role of usage		Transmitter [TX]	Receiver [RX]	Transmitter [TX]	Receiver [RX]	Transmitter [TX]	Receiver [RX]
HDMI compliance		Yes					
HDCP compliance		Yes					
Video bandwidth		Single-link 225MHz [6.75Gbps]					
Video support		480i / 480p / 720p / 1080i / 1080p60 up to 12-bit					
HDMI over UTP transmission [8-bit]		Full HD (1080p)-40m (130ft) [CAT5e] / 50m (165ft) [CAT6] HD (720p/1080i)-50m (165ft) [CAT5e] / 60m (200ft) [CAT6]					
Audio support		Surround sound (up to 7.1ch) or stereo digital audio					
Equalization		8-level digital control at RX					
Input TMDS signal		1.2 Volts [peak-to-peak]					
Input DDC signal		5 Volts [peak-to-peak, TTL]					
ESD protection		[1] Human body model — ±19kV [air-gap discharge] & ±12kV [contact discharge] [2] Core chipset — ±8kV					
PCB stack-up		4-layer board [impedance control — differential 100Ω; single 50Ω]					
Input		1x HDMI	2x RJ-45	1x HDMI	2x RJ-45 1x 3.5mm	1x HDMI	1x RJ-45
Output		2x RJ-45	1x HDMI	2x RJ-45 1x 3.5mm	1x HDMI	1x RJ-45	1x HDMI
HDMI source control		No		Controllable via IR pass-through from RX to TX with IR extenders		No	
IR remote control		N/A		Electro-optical characteristics: τ = 25° Carrier frequency: 36-40kHz		N/A	
HDMI connector		Type A [19-pin female]					
RJ45 connector		WE/SS 8P8C with 2 LED indicators					
3.5mm connector		None	None	IR blaster	IR receiver	None	None
Rotary switch		None	Signal level EQ	None	Signal level EQ	Mode	Signal level EQ
Mechanical		HE2		HE2IR		HE1	
Housing		Metal enclosure					
Dimensions [L x W x H]	Model	[TX/RX] — 85 x 60 x 25mm [3.3” x 2.4” x 1”]				93x60x25mm [3.7”x2.4”x1”]	
	Package	270 x 175 x 80mm [10.6” x 6.9” x 3.1”]					
Weight	Model	315g [11oz]		320g [11oz]		405g [14oz]	
	Package	685g [1.5 lbs]		720g [1.6 lbs]		815g [1.8 lbs]	
Power supply		5V 4A DC		5V 4A DC		5V 2A DC	
Power consumption		1 Watt [max]					
Operation temperature		0~40°C [32~104°F]					
Storage temperature		-20~60°C [-4~140°F]					
Relative humidity		20~90% RH [no condensation]					
Package Contents		1x HE2 [TX & RX] 1x 5V power supply unit 1x User manual		1x HE2IR [TX & RX] 1x IR blaster 1x IR receiver 1x 5V power supply unit 1x User manual		1x HE1 [TX & RX] 2x 5V power supply unit 1x User manual	

FEATURES

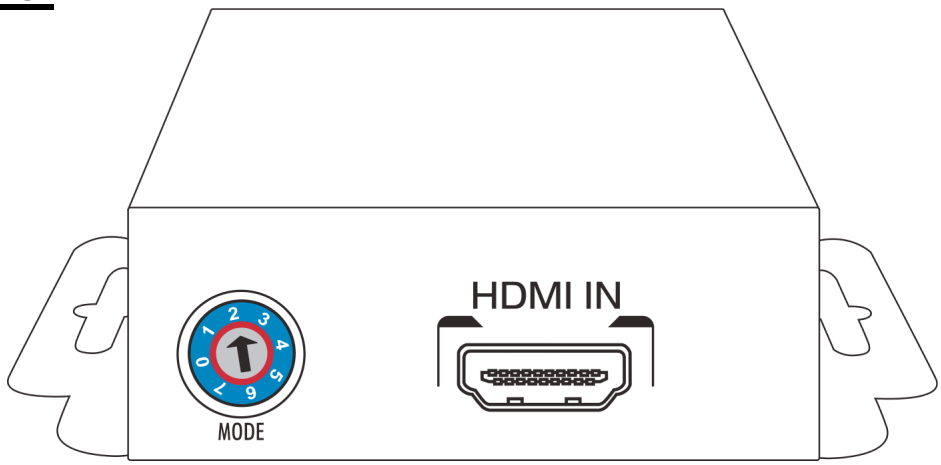
- State-of-the-art Silicon Image (founder of HDMI) chipset embedded for utmost compatibility and reliability
- Extend the transmission length up to 60m (200ft) from the HDMI sources under HD resolution (1080i or 720p at 8 bit color depth)
- Extend the transmission length up to 40m (130ft) from the HDMI sources under Full HD resolution (1080p at 8 bit color depth)
- Extend the transmission length up to 20m (65ft) from the HDMI sources under Full HD resolution (1080p at 12 bit color depth)
- HDCP compliant
- Minimize the cable skew by adjustable 8-level equalization control
- Pure unaltered uncompressed 7.1ch digital HDMI over Cat-5/5e/6 cable transmission
- DTS-HD and Dolby True HD high bit rate audio support
- Allows cascading
- Perfectly integrated with other HDMI over CAT series products

The length depends on the characteristics and quality of the cables. Higher resolutions and longer transmission distances require low skew cables (<25ns/100m) for best performance. Unshielded CAT6 with metal RJ45 connectors is recommended.

PANEL DESCRIPTIONS

HE1-TX (Transmitter)

Input Panel



HDMI IN: Connects to a HDMI source with a HDMI male-male cable here

MODE:

0 = [Video] – supports up to HDMI 3D output. [Audio] – supports up to 7.1ch output
1 = [Video] – supports up to HDMI 3D output. [Audio] – locks to stereo audio output
2 = [Video] – locks to HDMI 1.2 output. [Audio] – supports up to 7.1ch output
3 = [Video] – locks to HDMI 1.2 output. [Audio] – locks to stereo audio output
4 = [Video] – DVI display mode. [Audio] – no audio output
5 = [Safe Mode] – uses default EDID[1] with support up to 1080p video and stereo audio
6 = [Default Mode] – uses default EDID[2] with support up to 1080p video and 7.1ch audio
7 = [EDID Learning Mode] – learns EDID[3] from the display

Note for EDID (Extended Display Identification Data) learning

Note 1. ***If you cannot get the audio/video output from the connected display from the first time setup. Please follow the instructions below to check if the extender is OK:***

Step 1 – ***Please set the rotary arrow on TX at "Mode 5" for Safe Mode, and wait for the LED of the RJ-45 connector to blink for a couple seconds.***

Step 2 – ***Please turn the rotary arrow counterclockwise [↺] from Mode 5 to Mode 3. If you can get audio/video from the display, you can stay tuned at this setting for 720p or 1080i and stereo audio. If you need to get 720p/1080i with 7.1ch audio output, please turn the rotary arrow counterclockwise [↺] from Mode 3 to Mode 2. For better audio/video output, please check Note 2. If you still cannot get the audio/video out normally, please go on to the next step.***

Step 3 – ***Please turn the rotary arrow counterclockwise [↺] from Mode 3 to Mode 7. Wait a few seconds until the LED of the RJ-45 connector dims and then lights again.***

Step 4 – ***Please turn the rotary arrow clockwise [↻] from Mode 7 to Mode 1. You should have normal audio/video output. If not, please contact technical support.***

Note 2. For desirable 1080p video output, please follow the instructions below:

Step 1 – Please set the rotary arrow on TX at "Mode 6" for Default Mode, and wait for the LED of the RJ45 connector to blink for a couple seconds.

Step 2 – Please turn the rotary arrow clockwise [↻] from Mode 6 to Mode 1. If you can get audio/video from the display, you can stay tuned at this setting for 1080p and stereo audio. If you need to get 1080p with 7.1ch audio output, please turn the rotary arrow counterclockwise [↺] from Mode 1 to Mode 0. If you cannot get the audio/video out normally, please go on to the next step.

Step 3 – Please turn the rotary arrow counterclockwise [↺] from Mode 0/1 to Mode 7. Wait a few seconds until the LED of the RJ-45 connector dims and then lights again.

Step 4 – Please turn the rotary arrow clockwise [↻] from Mode 7 to Mode 0/1. You should have your desirable audio/video output. If not, please follow the instruction in Note 1.

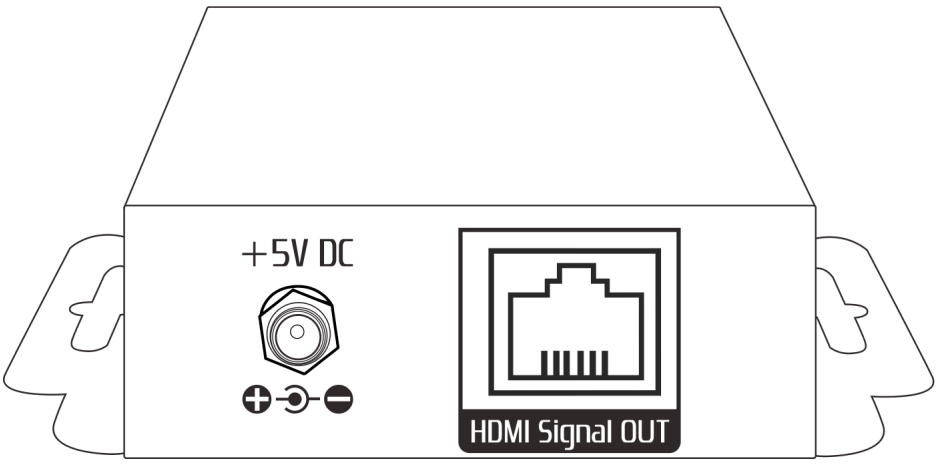
Note 3. To learn EDID from the HDMI display, please follow the instruction below:

Step 1 – Please connect the display which you want to read EDID with a HDMI cable to the transmitter's HDMI IN and set the rotary arrow at Mode 7 so the TX can learn the EDID information from the connected display. The LED on the RJ45 connector of TX will dim and light again in a few seconds, which indicates the EDID learning procedure is complete.

Step 2 – Please turn the rotary arrow clockwise [↻] from Mode 7 to Mode 0 or Mode 1 for desirable audio setting. DO NOT let the rotary arrow pass by Mode 5 and Mode 6 which will erase the EDID just learned and restore the default EDID.

HE1-TX (Transmitter)

Output Panel

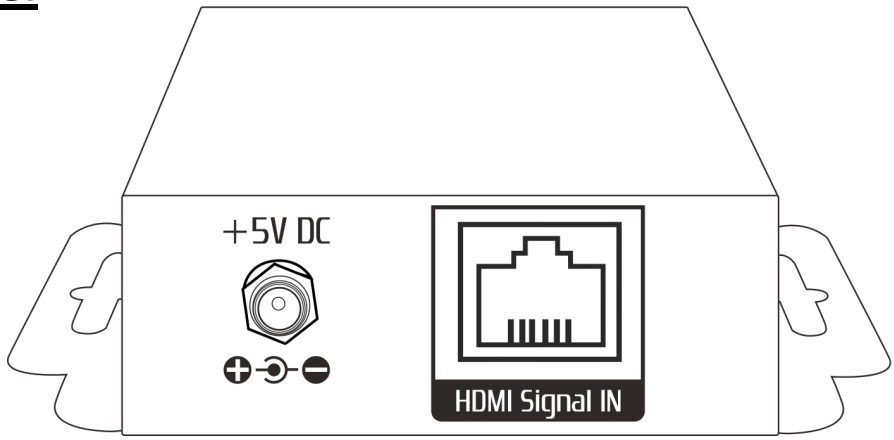


+5V DC: Connect to 5V DC power supply.

HDMI Signal OUT: Connect to the **HDMI Signal IN** RJ45 port on the receiver unit HE2-RX.

HE1-RX (Receiver)

Input Panel

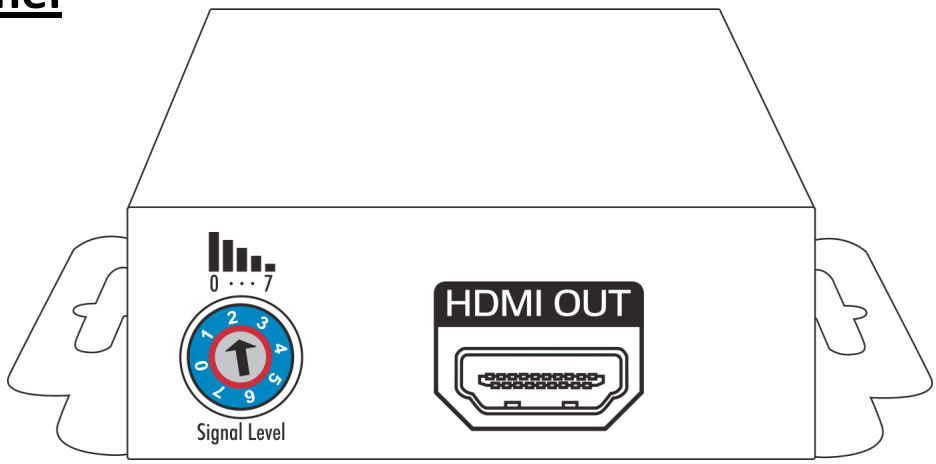


+5V DC: Connect to a 5V DC power supply unit.

HDMI Signal IN: Connect to the **HDMI Signal OUT** RJ45 port on the transmitter unit HE1-TX.

Note: In limited space applications a special USB Power cable can be used (Sold Separately) **Model: 2USB135L** will pull USB Power from USB on TV instead of using enclosed power supply.

Output Panel



HDMI OUT: Connect to a HDMI display with a HDMI Male-Male cable here.

Signal Level: Adjust the 8-level signal level equalization control to the received HDMI signals. The HDMI signal level varies from 0 (strongest) to 7 (weakest) for respective transmission length from longest possible range to short distance. Dial the Signal Level from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issues that would shorten the product's life significantly!

HARDWARE INSTALLATION

1. Connect your HDMI/DVI source (such as a Blu-ray Disc player) to the transmitter unit HE1-TX.
2. Connect your HDMI/DVI display (such as a LCD TV) to the receiver unit HE1-RX.
3. Connect a Cat-5/5e/6 cable between the transmitting and receiving units.
4. Make sure this Cat-5/5e/6 cable is tightly connected and not loose.
5. Plug in a 5V DC power supply to the power jack of the receiving unit HE1-RX, or use USB Power Cable **Model: 2USB135L (Sold Separately)**
6. Plug in the other 5V DC power supply to the power jack of the transmitting unit HE1-TX.
7. If you see flickering or blinking image on the display, dial the **Signal Level** from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issues that would shorten the product's life significantly!

EDID LEARNING

1. Turn on HE1-TX.
2. Turn the **MODE** of HE1-TX counterclockwise [↺] to **7**.
3. Connect the HDMI display to the "**HDMI IN**" of HE1-TX with a HDMI cable. The LED on the RJ45 connector of HE1-TX will dim and light again, which indicates the EDID learning procedure is complete.
4. Turn the **MODE** of HE1-TX clockwise **[↻]** from 7 to 0 (for surround sound) or 1 (for stereo). ***The most important thing is don't let the rotary arrow pass through 6 which will erase the EDID just learned and restore to default EDID.***
5. Unplug the HDMI cable from the display and follow the instruction in [Hardware Installation] to set up the HE1.

NOTICE

1. Adjust the 8-level signal level equalization control to the received HDMI signals. Dial the **Signal Level** from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issues that would shorten the product's life significantly!
2. If the DVI or HDMI device requires the EDID information, please use EDID Reader/Writer to retrieve and provide DVI or HDMI EDID information.
3. All HDMI over CAT5 transmission distances are measured using Belden CAT5e 125MHz UTP cable and ASTRODESIGN Video Signal Generator VG-859C.
4. The transmission length is largely affected by the type of Cat-5/5e/6 cables, the type of HDMI sources, and the type of HDMI display. The testing result shows solid UTP cables (usually in the form of 1000ft bulk cables) can transmit a lot longer signals than stranded UTP cables (usually in the form of fixed length patch cords). Shielded STP cables are better suited than unshielded UTP cables. A solid UTP Cat-5e cable shows longer transmission range than stranded STP Cat-6 cable. For long extension applications, solid UTP/STP cables are the only viable choice.
5. EIA/TIA-568-B termination (T568B) for category cables is recommended for better performance.
6. To reduce the interference among the unshielded twisted pairs of wires in UTP cable, one can use shielded STP cables to improve EMI problems, which is worse in long transmission.
7. Because the quality of the Cat-5/5e/6 cables has the major effect on how long the transmission limit can achieve and how good is the received picture quality, the actual transmission range is subject to one's choice of Cat-5/5e/6 cables. For desired resolutions greater than 1080i or 1280x1024, a Cat-6 cable is recommended.
8. If your HDMI display has multiple HDMI inputs, it is found that the first HDMI input [HDMI input #1] generally can produce better transmission performance among all HDMI inputs.

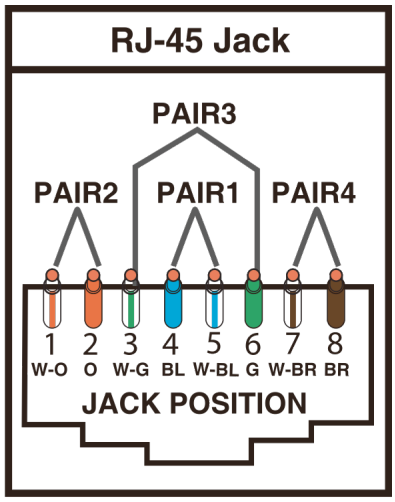
RJ-45/CABLE TRANSMISSION DIAGRAMS

Performance Guide for HDMI over CAT5/6 Cable Transmission

Performance rating		Type of CAT5/6 cable		
Wiring	**Shielding**	**CAT5**	**CAT5e**	**CAT6**
Solid	Unshielded (UTP)	★★★	★★★★	★★★★★
	Shielded (STP)	★★★	★★★	★★★★
Stranded	Unshielded (UTP)	★	★★	★★
	Shielded (STP)	★	★	★★
Termination		Please use **EIA/TIA-568-B** termination (**T568B**) at any time		

Audio/Video Signal Port

Data Link TIA/EIA-568-B		
PIN	Color	Function
1	W-O	TX0-
2	O	TX0+
3	W-G	TX1-
4	BL	TX2-
5	W-BL	TX2+
6	G	TX1+
7	W-BR	TXC-
8	BR	TXC+



Do You Need Technical Support?

ZuumMedia is proud to offer free technical support to ensure your product is operating correctly.

If you are experiencing difficulties setting up this product, please call us for assistance 1-888-861-7351 or visit www.zuummedia.com for more information.

Technical support representatives are available Monday through Friday, 8:00am to 6:00pm (CMT)

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